

Appl.No. 09/990,965  
Amdt. dated January 31, 2006  
Reply to Office Action of November 01, 2005

### REMARKS / ARGUMENTS

Claims 1-16 are pending in this application. Claims 1-16 stand rejected.

With this Amendment, Independent Claims 1, 4, 7, 9, 12, and 15 have been amended to substantially incorporate those limitations originally recited in dependent claim 3 -- now canceled by this Amendment. Finally, dependent claim 2 is canceled by this Amendment.

Entry of this Amendment is appropriate since the amendments (a) place the application in condition for allowance (for the reasons discussed herein); (b) do not raise any new issues requiring further search and/or consideration; (c) do not present any additional claims and (d) place the application in better form for appeal- should such appeal be necessary. Entry is therefore respectfully requested.

If, however, the Examiner believes that there are any unresolved issues requiring adverse action in any of the claims now pending in the application, it is requested that the Examiner telephone Jeffery J. Brosemer, Ph.D., ESQ. At 732-335-5773, so that arrangements may be made for resolving such issues as expeditiously as possible.

#### Claims Rejection – 35 U.S.C. §103(a)

Claims 1, 7-9, 15 and 16 were rejected under the provisions of 35 U.S.C. §103 (a) as being unpatentable over United States Patent No. 6,072,615 issued to Mamyshev on June 6, 2000, (hereinafter the Mamyshev

Appl.No. 09/990,965  
Amdt. dated January 31, 2006  
Reply to Office Action of November 01, 2005

'615 patent) in view of United States Patent No. 6,081,355 issued to Sharma et al. on June 7, 2000 (hereinafter the Sharma '355 patent).

In addition, Claims 2 and 10 were rejected under 35 U.S.C. §103 (a) as being unpatentable over the Mamyshev '615 patent in view of the Sharma '355 patent further in view of United States Patent No. 6,097,525 issued to Ono et al, (hereinafter the Ono '525 patent).

Still further, Claims 3 and 11 were rejected under 35 U.S.C. §103 (a) as being unpatentable over the Mamyshev '615 patent in view of the Sharma '355 patent further in view of United States Patent Pub No. 2003/0002121 A1 (hereinafter the Miyamoto application).

Finally, Claims 4-6 and 12-14 were rejected under 35 U.S.C. §103 (a) as being unpatentable over the Mamyshev '615 patent in view of United States Patent No. 6,819,872 issued to Farries et al, (hereinafter the Farries '872 patent).

Before discussing this cited art in detail however, it is useful to first review the applicants' claimed invention of the instant application. In particular the applicants have developed an optical telecommunications transmission system and accompanying optical transmitter that generates a stream of return-to-zero (RZ) optical pulses in which alternate ones of the pulses have orthogonal polarizations. The phase(s) of these optical pulses are then DPSK modulated as a function of input data applied to the transmitter, thereby encoding the input data onto the stream of RZ optical pulses.

Appl.No. 09/990,965  
Amdt. dated January 31, 2006  
Reply to Office Action of November 01, 2005

Consequently, transmitted (and received) signals according to the present applicants' claimed invention are in RZ-DPSK format in which data is carried through a phase difference (e.g. of 0 or  $\pi$ ) between adjacent bits in the stream.

These aspects of the present invention are conveyed in independent claim 1, which now recites in applicable part:

- "1. A transmitter for use in optical communication system, said transmitter comprising
- a means for generating a stream of RZ optical pulses in which alternate ones of such pulses have essentially orthogonal polarizations, and
  - a means for modulating the phases of said optical pulses as a function of input data applied to said transmitter thereby encoding said input data onto said stream of RZ optical pulses,
- wherein said modulating means is a Differential Phase Shift Keying (DPSK) modulator."

Now, in formulating the rejection(s) of the claimed invention of the instant application, and in particular Claims 1, 7-9, 15 and 16, the Examiner relied upon the belief(s) that the Mamyshev '615 patent disclosed a number of the limitations of the claimed invention. More specifically, the Examiner stated that the Mamyshev '615 patent taught an optical communication system comprising a means for generating a stream of RZ optical pulses (16 of fig. 1); a means for modulating the phase of said optical pulses (14 of fig. 1) as a function of input data (28 of fig. 1) to encode said input data input data into said stream of RZ optical pulses (col. 2 lines 20-22 and lines 44-45).

Appl.No. 09/990,965  
Amdt. dated January 31, 2006  
Reply to Office Action of November 01, 2005

As the applicants will now show however, the cited Mamyshev '615 patent does not disclose the generation of a stream of RZ optical pulses in which alternate ones are orthogonally polarized and which are subsequently phase modulated into a stream of RZ optical pulses as taught and claimed by the applicants of the instant application.

Rather, it is urged that the Mamyshev '615 patentees instead discloses the generation of a Continuous Wave (CW) signal, which is subsequently phase modulated according to electrical RZ data, thereby producing optical RZ data.

This thesis, that the patentees there disclose the generation of a CW signal, is substantiated by inspection of the cited FIG 1 of the Mamyshev '615 patent. More specifically, this FIG. 1 illustrates a single frequency laser (12) providing input into phase modulator (14), which subsequently modulates the CW signal according to electrical RZ data (28) thereby producing optical RZ data (32).

In describing the configuration of FIG 1, the Mamyshev '615 patentees further confirm our thesis that they do not modulate a stream of RZ optical pulses. In particular:

"...a continuous wave (CW) laser or other optical source for generating an optical carrier signal, and an RZ data generator for generating an electrical data stream. The phase modulator modulated the RZ electrical data stream onto the optical carrier signal to generate a phase-modulated optical signal..." (Col.2, Lines 17-22)

Appl.No. 09/990,965  
Amdt. dated January 31, 2006  
Reply to Office Action of November 01, 2005

There is simply no teaching or suggestion in the Mamyshev '615 patent of generating a stream of RZ optical pulses – in which alternate ones have orthogonal polarizations – and then modulating the pulses with data. Only the applicants – in the instant application – provide such inventive teachings.

Finally with specific respect to the Mamyshev '615 patent and that FIG 1, it is noted that the "optical phase modulated signal" output from phase modulator (14) and presented to optical filter (30), which spectrally selects a "Stokes or Anti-Stokes portion of the phase-modulated signal spectrum" (col 2., lines 20-29) generates an on-off-keying (RZ-OOK) format signal and not the RZ-DPSK format signal described and claimed in the present application.

As the Examiner can readily appreciate, the RZ-OOK format of the Mamyshev '615 patent – in which data are carried by an "on" and "off" in optical intensity - is in sharp contrast to the RZ-DPSK format of the present application in which data are carried through a phase difference (e.g., 0 or  $\Pi$ ) between adjacent bits.

Turning now to the combination of references, while the Examiner correctly noted that the Mamyshev '615 patent fails to disclose the generation of optical pulses in which alternate ones have orthogonal polarizations, he nevertheless concludes that the combining the teachings of the Mamyshev '615 patent with that of the Sharma '355 patent cures this infirmity. The Examiner is mistaken.

More particularly, the Examiner sets out in the Office Action that the Mamyshev '615 patentees disclose that "... other types of RZ data generators, providing a variety of different RZ electrical signal shapes, may

Appl.No. 09/990,965  
Amdt. dated January 31, 2006  
Reply to Office Action of November 01, 2005

also be used to generate an RZ electrical data stream suitable for application to the phase modulator ... " [emphasis supplied]

Using this as motivation, the Examiner then reaches out to the Sharma '355 patent - which generally does disclose the generation of a stream of optical pulses wherein alternate pulses have essentially orthogonal polarizations – to serve as this hypothetical RZ data generator. However, not only is this combination improper, it still fails to teach or suggest the claimed invention of the instant application.

More specifically, and as recited in the relevant portion of the Mamyshev '615 patent above, the patentees there suggest that "...other types of generators ... providing a variety of different RZ electrical signal shapes, may be used to generate an RZ electrical data stream ... "However, the signals which the Sharma '355 patent describes – and to which the Examiner refers – are optical signals. Given the explicit reference to electrical signals by the Mamyshev '615 patent and no mention of optical signals – there is simply no motivation to make the combination suggested by the Examiner. In fact, given the explicit reference to electrical signals and not optical signals the patentees there actually teach away from the combination suggested by the Examiner in the Office Action. Accordingly, the applicants submit that this combination is not only improper, but explicitly teaches away from the invention of the instant application.

Finally, with reference to the Sharma '355 patent, it is noted that the patentees there do generally show an optical pulse train generator which may polarize two successive pulses perpendicular to each other – they do not – either explicitly or implicitly teach or suggest how such pulses may be

Appl.No. 09/990,965  
Amdt. dated January 31, 2006  
Reply to Office Action of November 01, 2005

subsequently modulated to convey information and certainly do not teach or suggest the polarization interleaved RZ-DPSK signal of the instant application.

Accordingly, the applicants submit that the cited references – taken alone or in the combination(s) suggested – fail to teach or suggest all of the limitations recited in independent claim 1, as amended. Consequently, the claimed invention cannot be rendered obvious by their teachings. Inasmuch as claims 7-9, 15 and 16 each substantially recites or further limits those limitations found in independent claim 1, they are not rendered obvious as well. Accordingly, the applicants submit that these claims are allowable and respectfully request the Examiner to withdraw these rejections.

Turning now to claims 2 and 10, it is noted that with this Amendment these claims have now been canceled. Accordingly, the rejections with respect to the now canceled claims are moot.

With respect to claims 3 and 11, the Examiner combines the teachings of the Miyamoto application with those believed provided by the Mamyshev '615 and the Sharma '355 patents in an attempt to cure the noted teaching deficiencies of these patents. However, this combination too fails to render the claimed invention obvious.

In particular, while the Miyamoto application does generally teach an optical transmission system wherein binary optical pulses are modulated using a DPSK format, it does not disclose the generation of a stream of RZ optical pulses in which alternate ones are orthogonally polarized and which are subsequently phase modulated into a stream of RZ optical pulses as taught and claimed by the applicants of the instant application.

Appl.No. 09/990,965  
Amdt. dated January 31, 2006  
Reply to Office Action of November 01, 2005

Accordingly, the Miyamoto application fails to cure the noted deficiencies of the Mamyshev '615 patent and the Sharma '355 patent. Consequently, it too fails to render obvious the independent claims 1 and 9, which now substantially recite those limitations originally recited in dependent claims 3 and 11, now canceled.

Lastly, claims 4-6 and 12-14 were rejected under the provisions of 35 USC § 103(a) as being unpatentable over the Farries '872 patent in view of the Mamyshev '615 patent.

This combination too, fails to teach or suggest all of the claimed aspects of the instant invention.

In particular, the Farries '872 patent discloses a transmitter in which soliton pulses are intensity modulated to encode input data. See, e.g., Col.2, Lines 4-10 of the Farries '872 patent where it recites in applicable part:

"...the signal source for the two channels is a single mode-locked laser 201, producing about 35-50 ps wide soliton pulses ..."

and Col. 2, lines 50-54:

"... Information is carried in the pulse streams by virtue of the presence or absence of pulses at the expected or nominal positions on the time axis...

Consequently, what the Farries '872 patent is teaching is, in fact OOK intensity modulation data encoding of soliton pulses. In sharp contrast, the applicants of the instant application claim a transmitter generating a stream of



Appl.No. 09/990,965  
Amdt. dated January 31, 2006  
Reply to Office Action of November 01, 2005

RZ optical pulses wherein adjacent pulses exhibit orthogonal polarization(s). Furthermore - according to the present invention - data is encoded by modulating the phases of the RZ optical pulses in DPSK format.

Accordingly, the applicants submit the Farries '872 patent and the Mamyshev '615 patent – taken alone or in the combination suggested by the Examiner - do not teach or suggest the limitations recited in independent claims 4 and 12. Therefore, the applicants believe that these claims are allowable in view of these references.

Inasmuch as dependent claims 5, 13, 6, and 14 each recites further distinguishing aspects of independent claims 4 and 12, the applicants submit that they are not obvious in view of the cited references and are therefore allowable as well.

**Conclusion:**

The Applicants submit that all of the Claims in their present form are allowable. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

Respectfully submitted,

JEFFERY J. BROSEMER

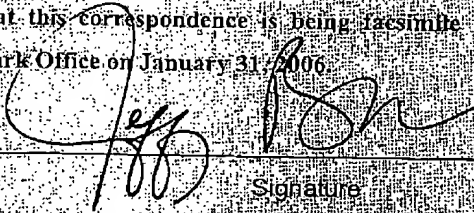
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Appl.No. 09/990,965  
Amdt. dated January 31, 2006  
Reply to Office Action of November 01, 2005

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